Status of the NOνA Experiment

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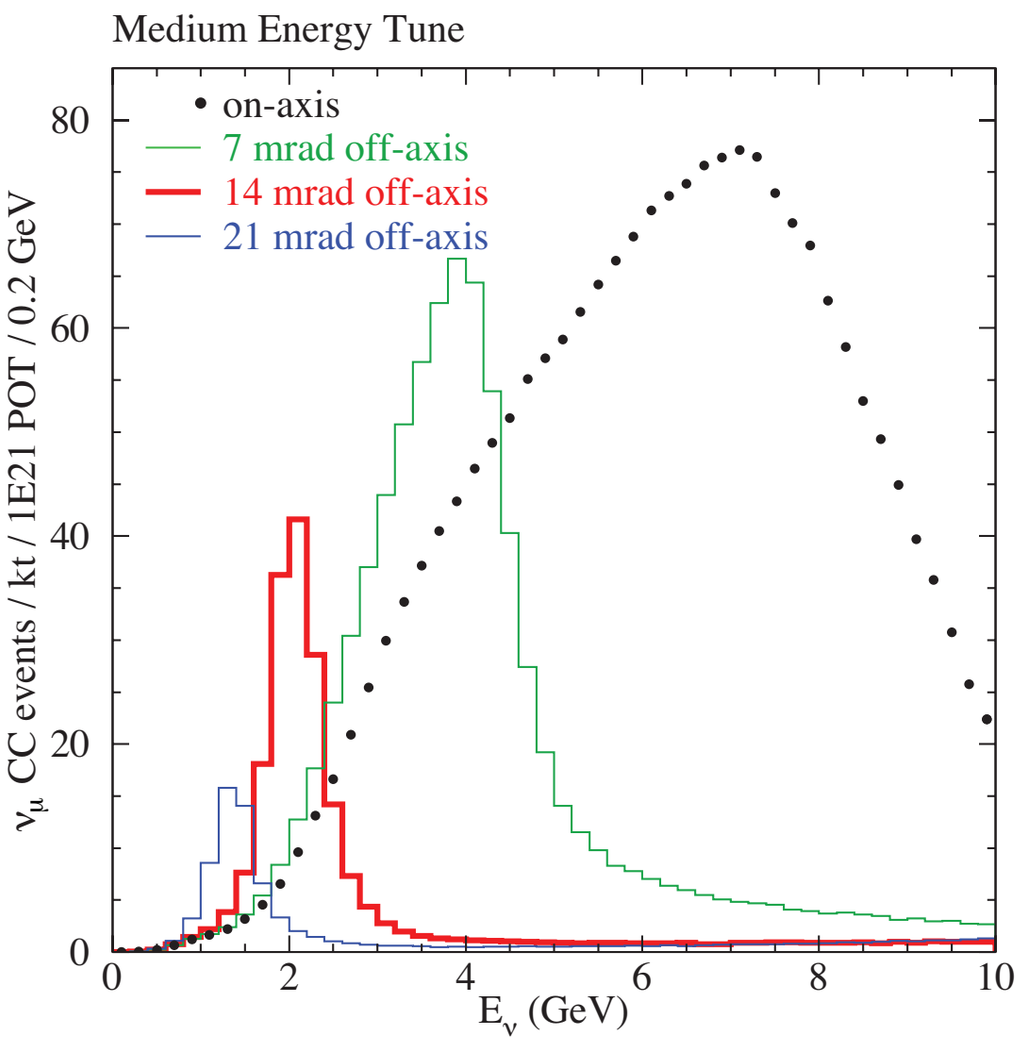
For the NOνA Collaboration

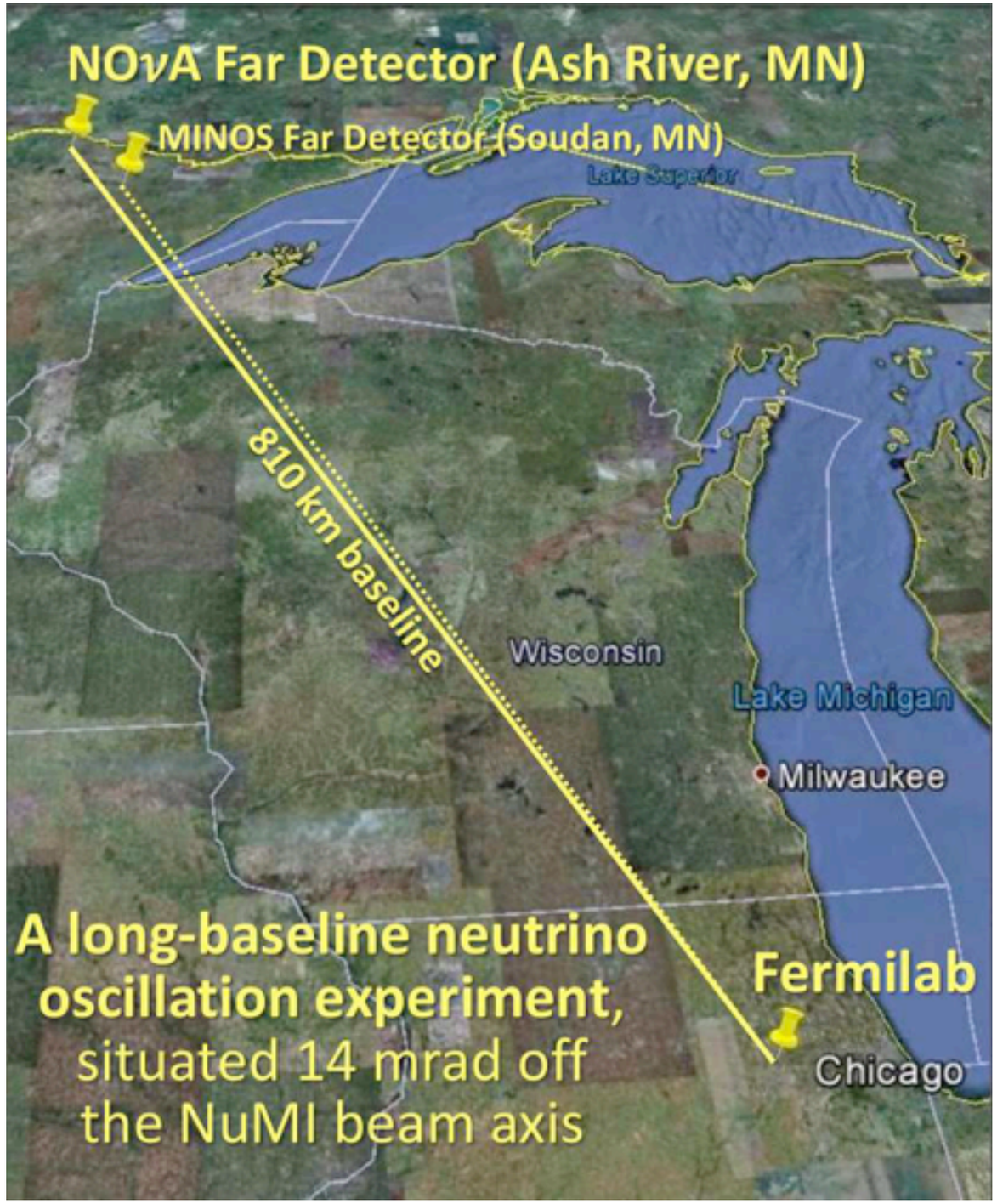
APS Meeting - April 2013
Denver, Colorado

Overview of NOνA

NuMi Off-axis ν_e appearance Experiment

- Mostly active liquid scintillator near and far detectors
- Beam energy peaked at 2 GeV





Overview of NOνA

NuMi Off-axis ν_e appearance Experiment

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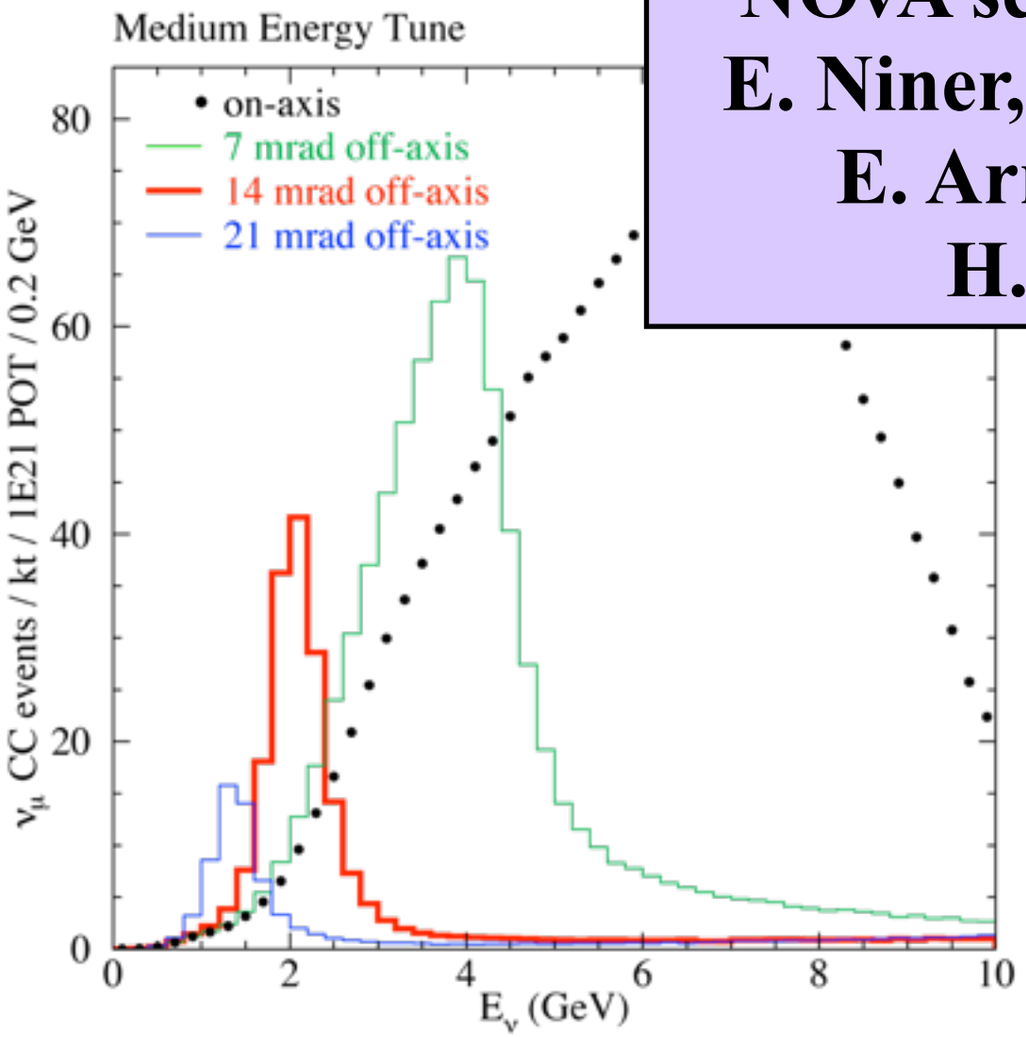
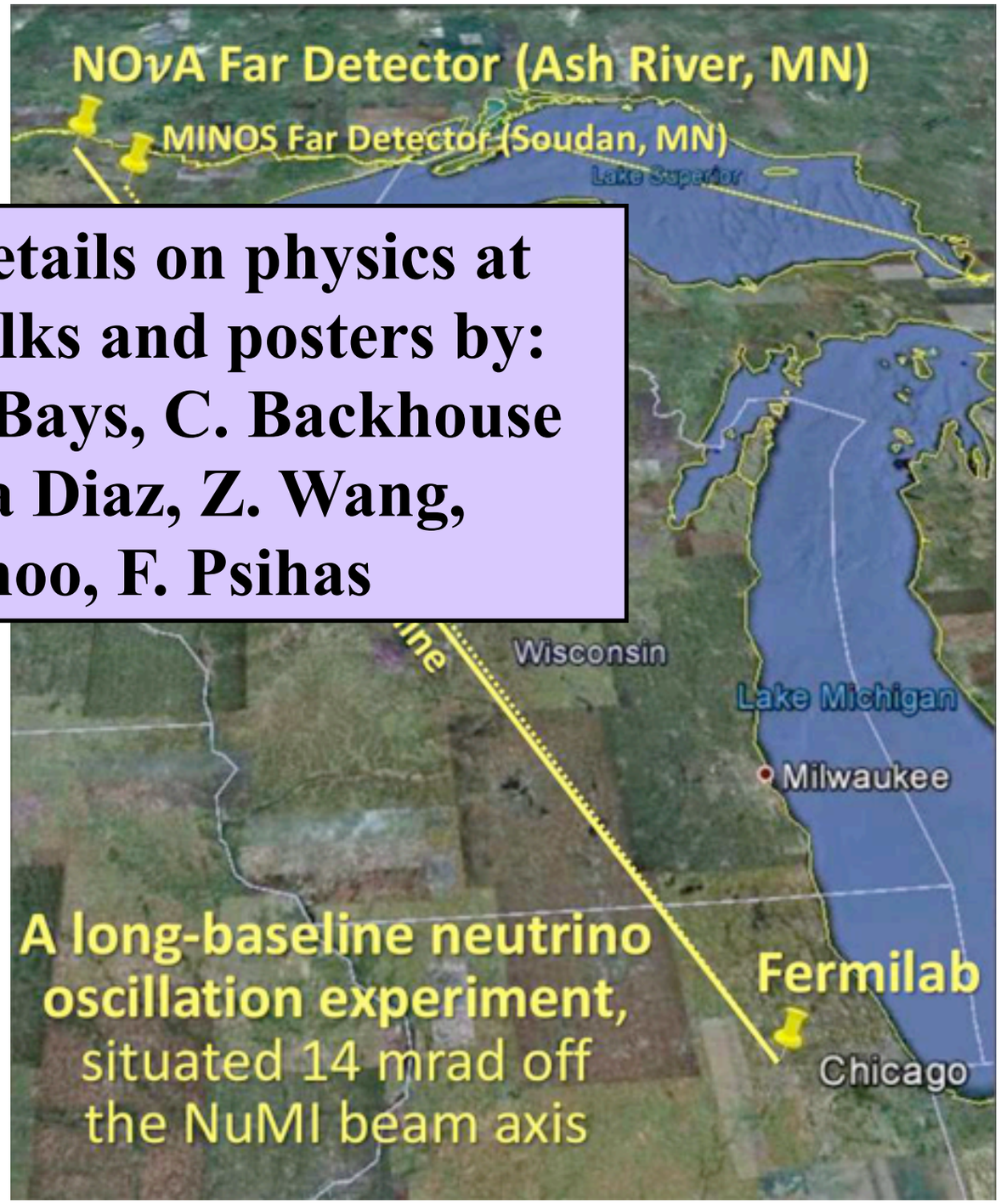
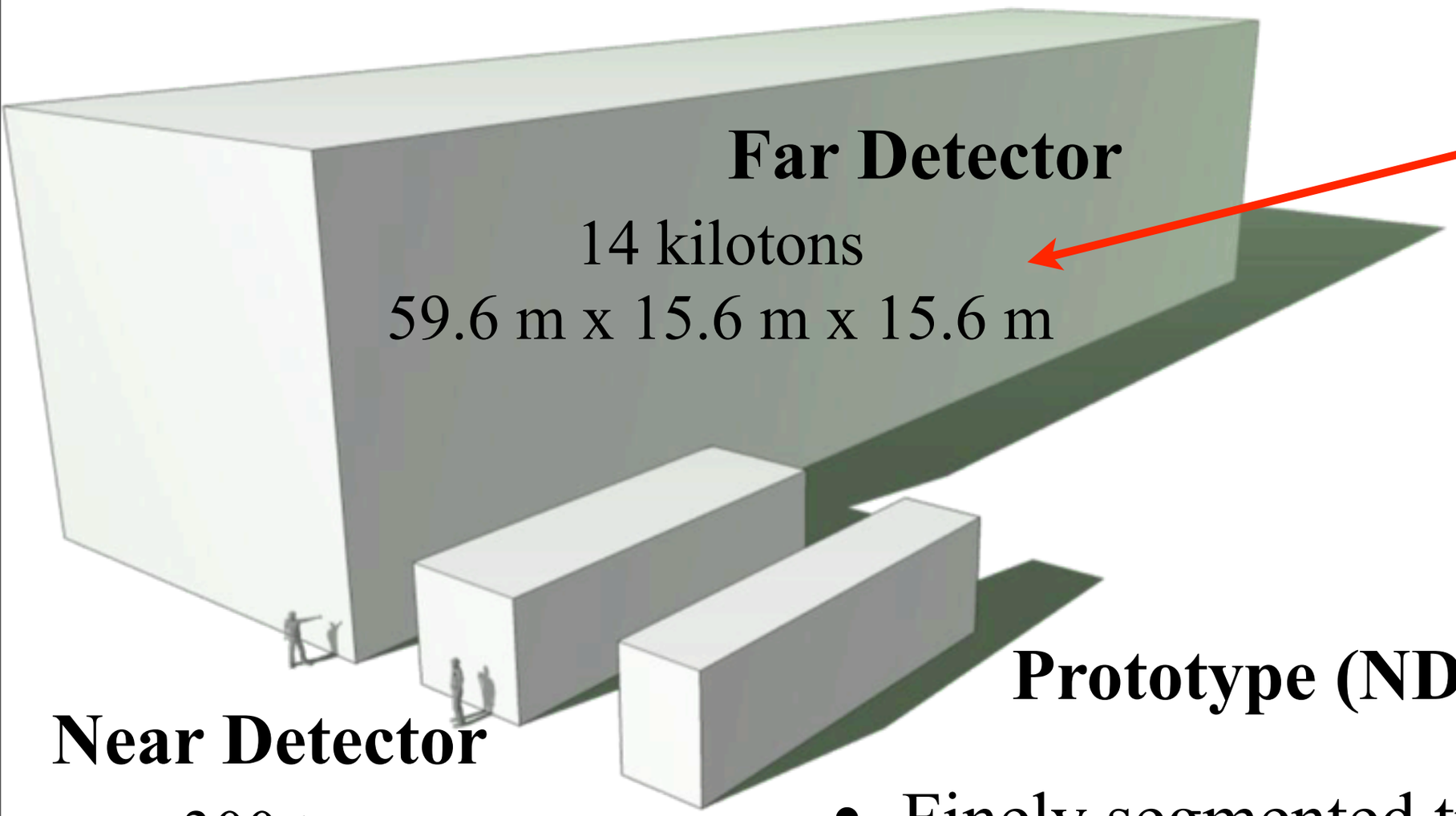
- Beam energy peak





For more details on physics at NOνA see talks and posters by: E. Niner, K. Bays, C. Backhouse E. Arrieta Diaz, Z. Wang, H. Sahoo, F. Psihas

The Detectors



Far Detector

14 kilotons

59.6 m x 15.6 m x 15.6 m

Near Detector

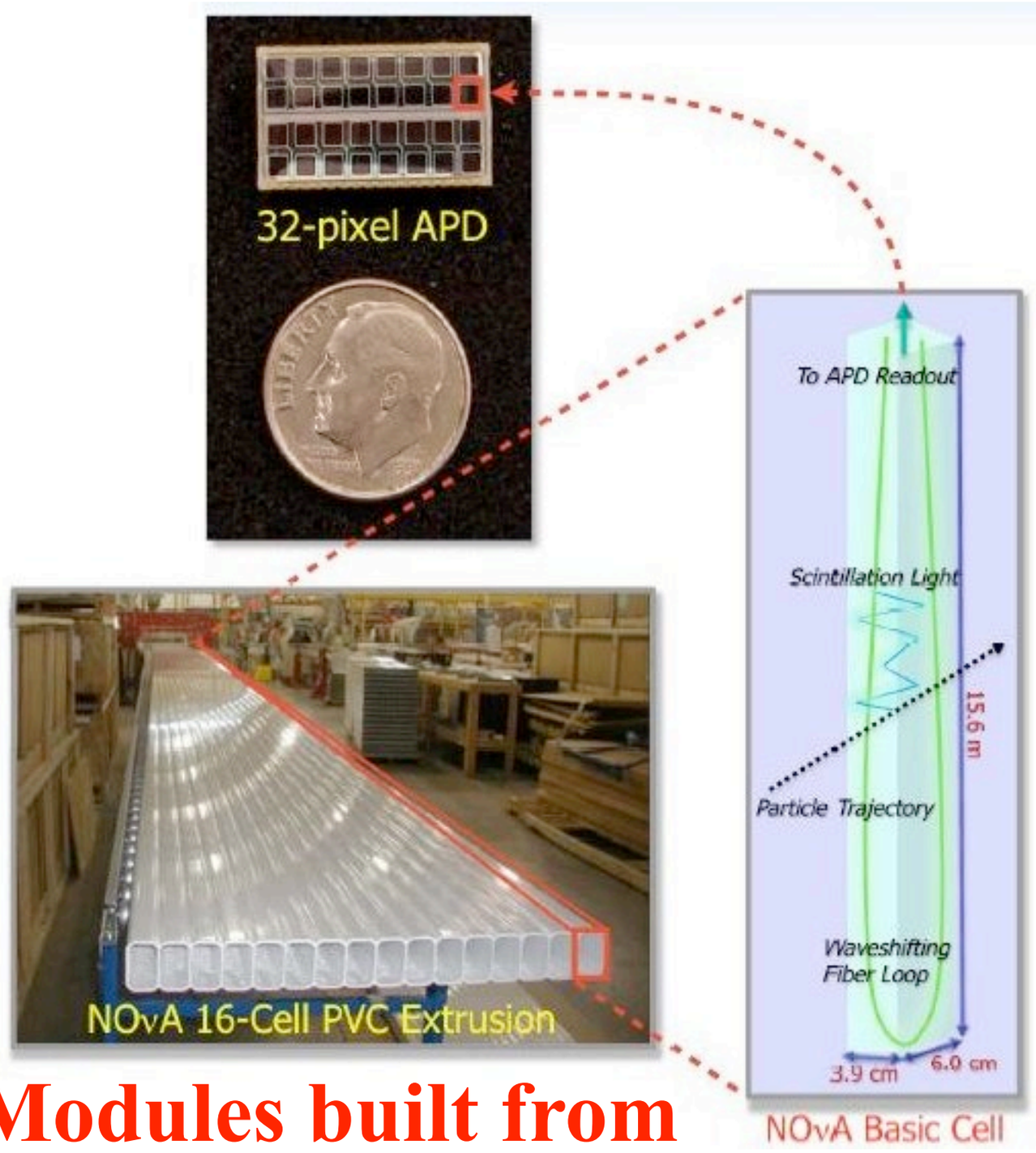
300 tons

14.3 m x 4.1 m x 4.1 m

Prototype (NDOS)

- Finely segmented tracking calorimeter
- 4x6 cm^2 PVC cells filled with mixture of mineral oil and scintillator
- Alternating horizontal and vertical cells for 3D reconstruction

Getting the Light Out



- Wavelength shifting fiber delivers light to avalanche photodiodes (APDs)
- One cell per APD pixel

Temperature	-15° C
Voltage	350-400 V
Gain	~100
Quantum Efficiency	~85%

Modules built from two extrusions

344k channels

The NOvA Module Factory

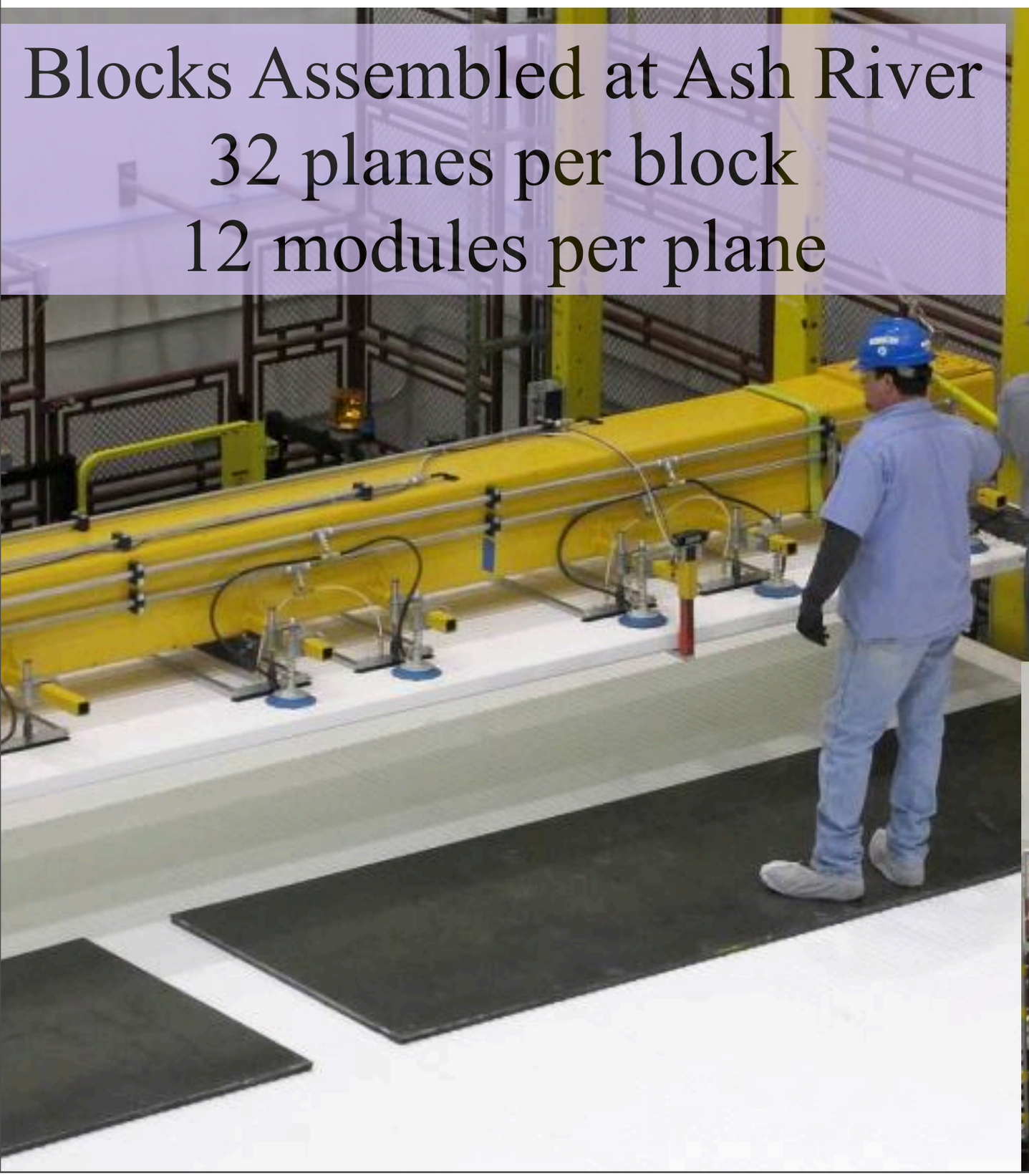
University of Minnesota
Minneapolis

The Far Detector Hall

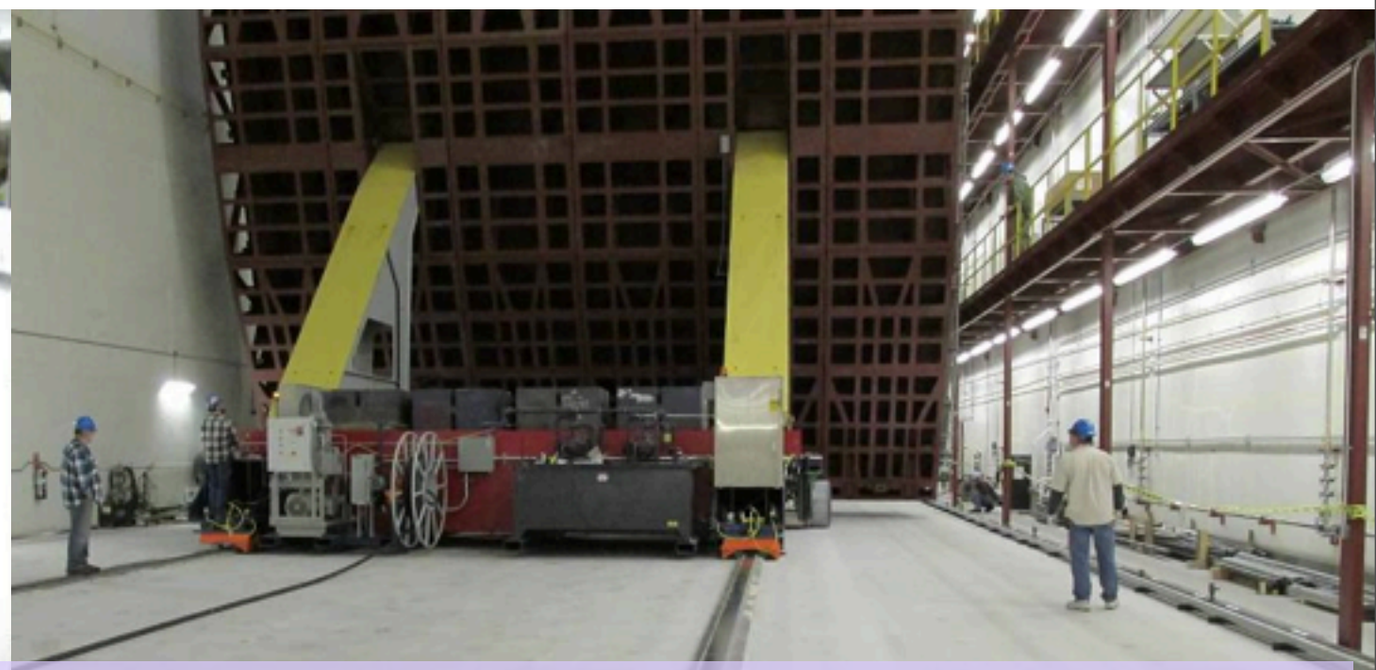
Ash River, Minnesota

Far Detector Assembly

Blocks Assembled at Ash River
32 planes per block
12 modules per plane



Block Installation



Pivoting and moving blocks into place
First block installed on 10 September

Watch video of first block installation at:
http://www.youtube.com/watch?v=gFpK00WJl90#14%20Mathew%20Meuther%20"NOvA%20Construction%20Status

Near Detector Status

Fermilab

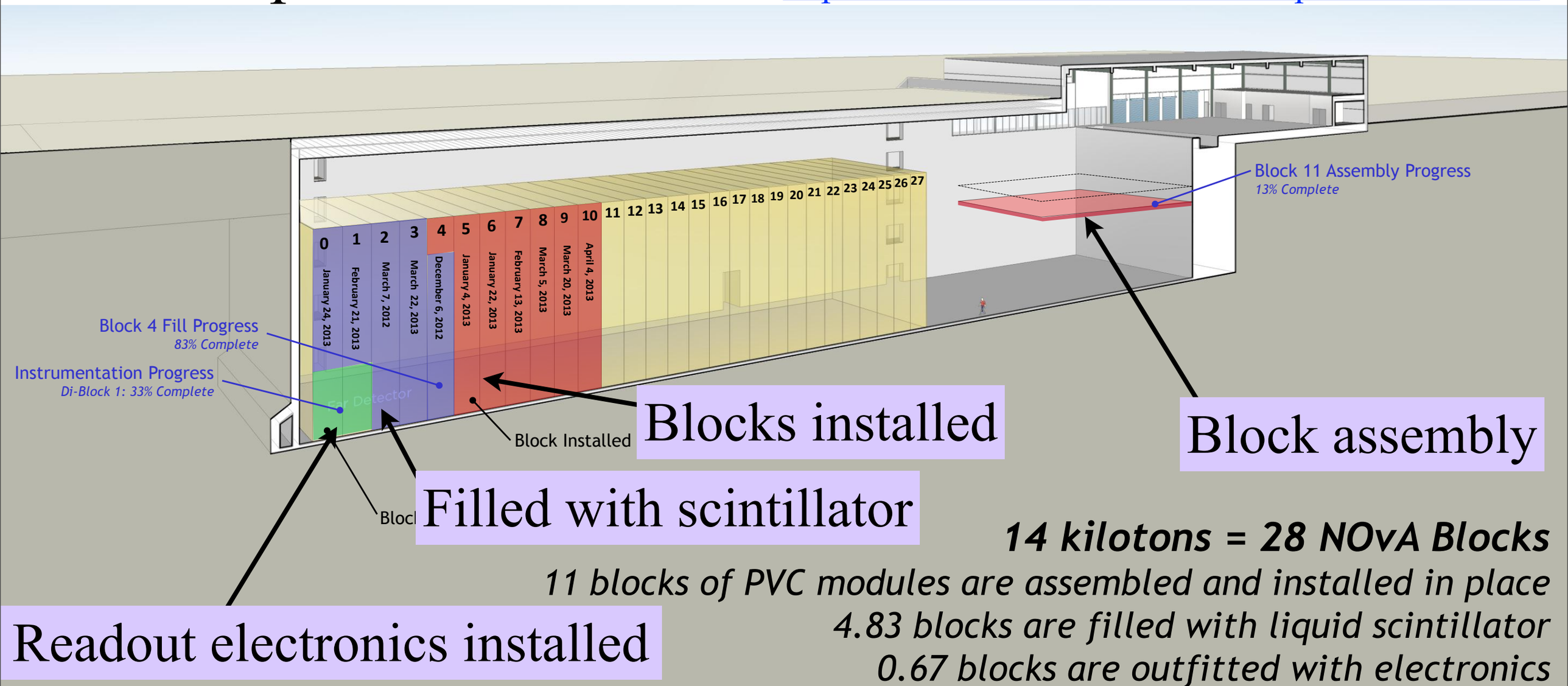
8 blocks of 24 planes
3 modules per plane

ND cavern nearly ready
Currently working on installation of movable access platform

Far Detector Status

As of 9-April-2013

Updated weekly at
https://www.facebook.com/novaexperiment?fref=ts



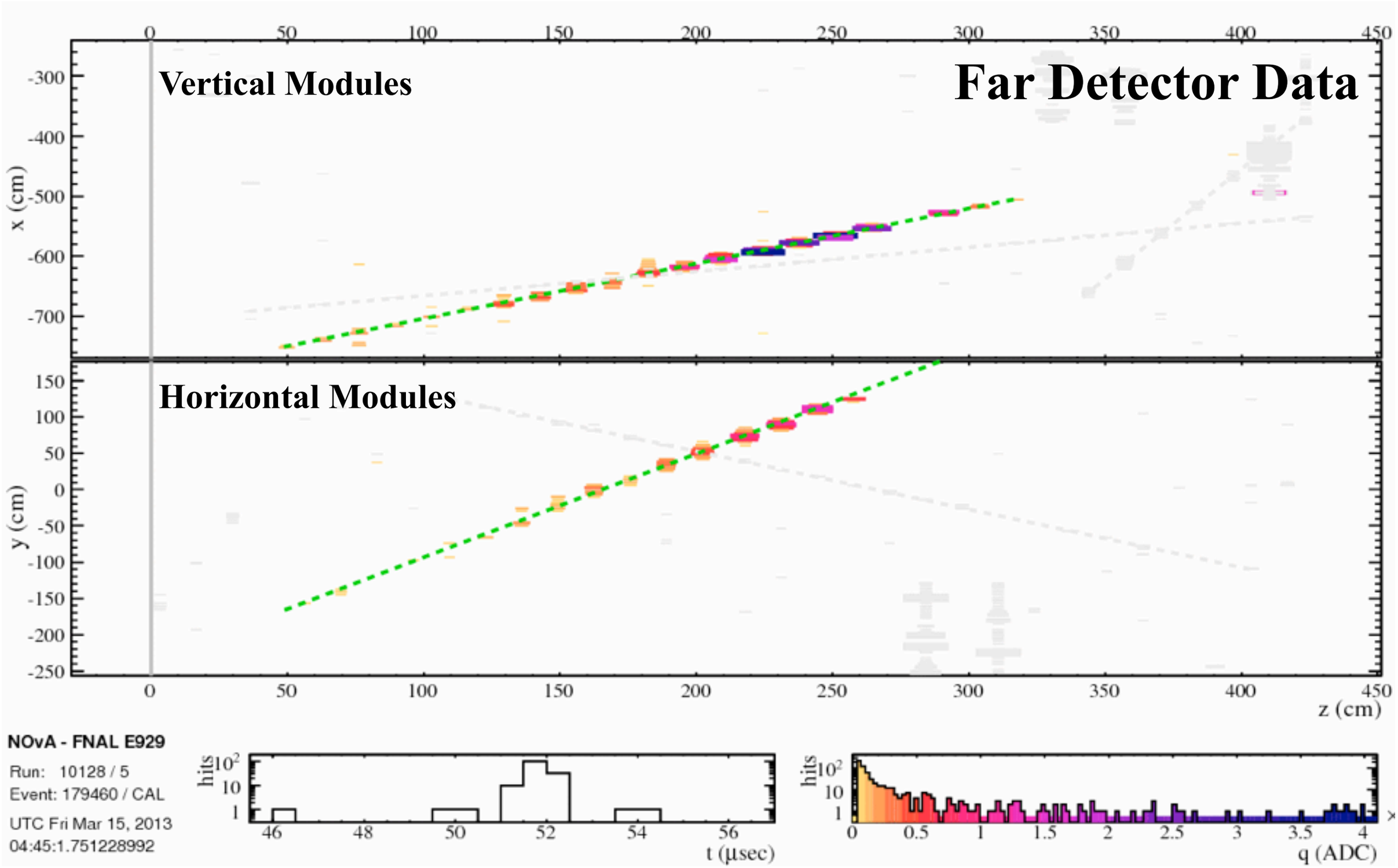
14 kilotons = 28 NOvA Blocks

11 blocks of PVC modules are assembled and installed in place
4.83 blocks are filled with liquid scintillator
0.67 blocks are outfitted with electronics

Schedule:
First beam in June 2013 (2.5 ktons for readout)
Finish module assembly by early 2014
Fully instrumented by August 2014

First Data from NOvA

Event Displays



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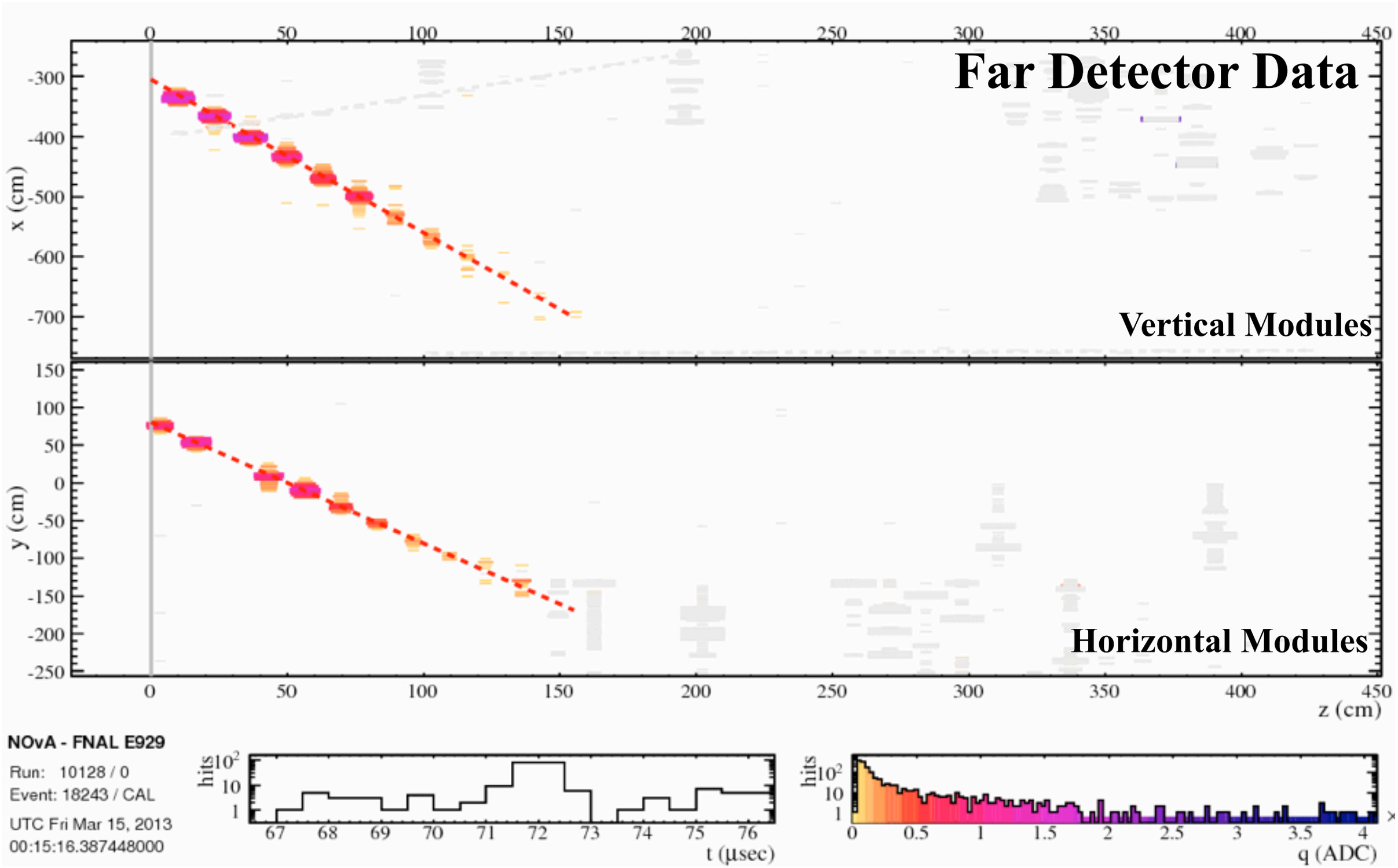

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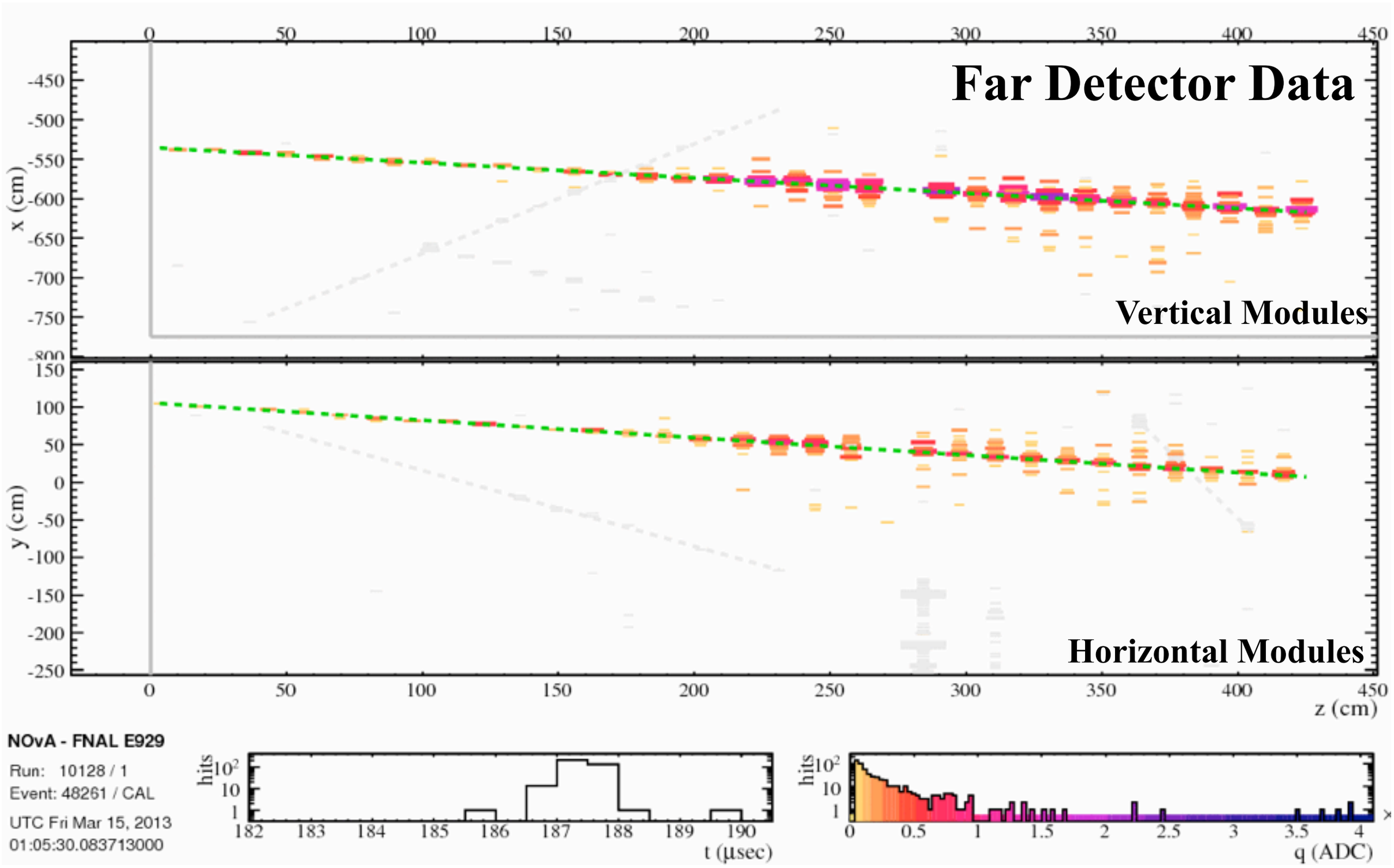
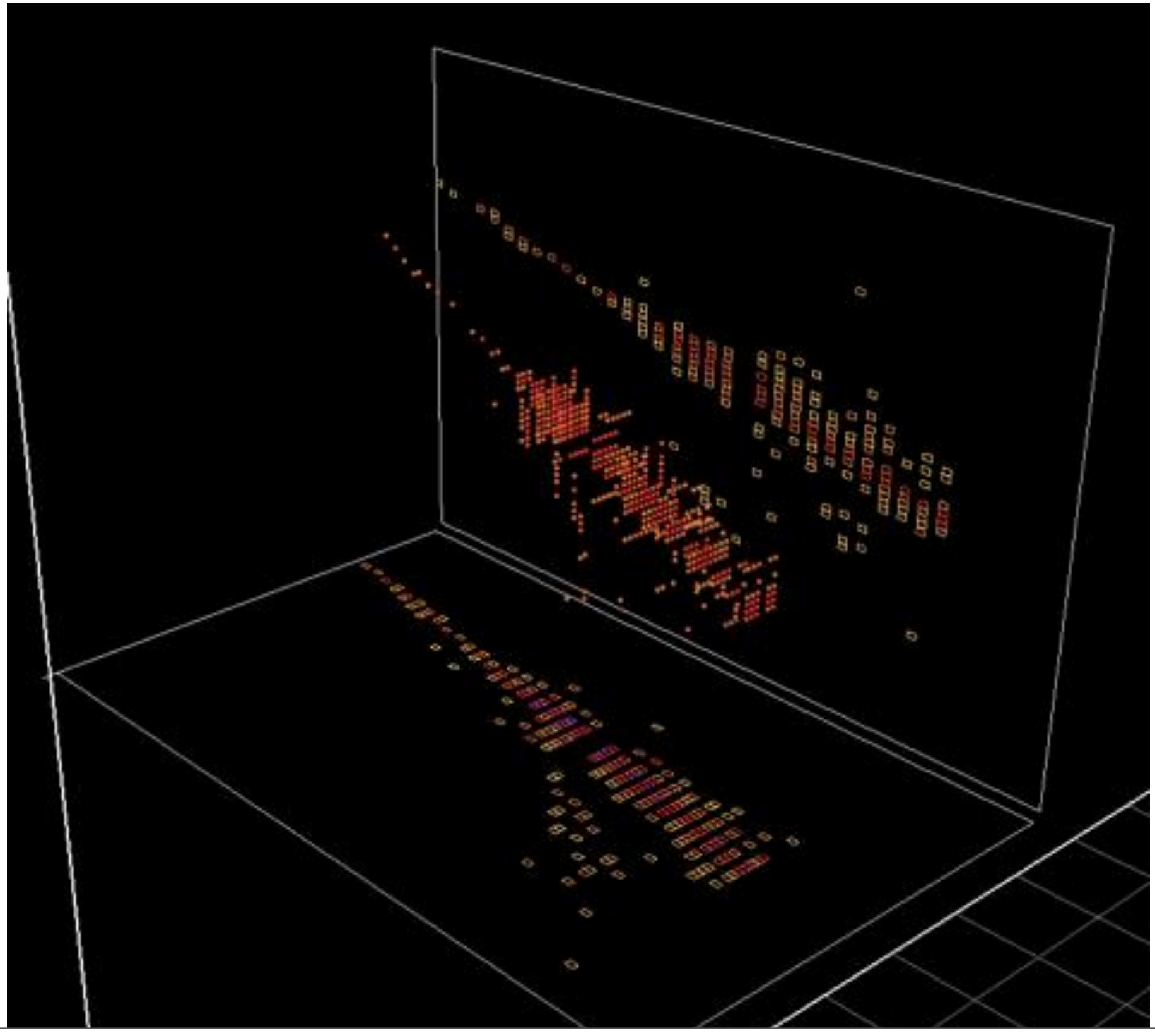
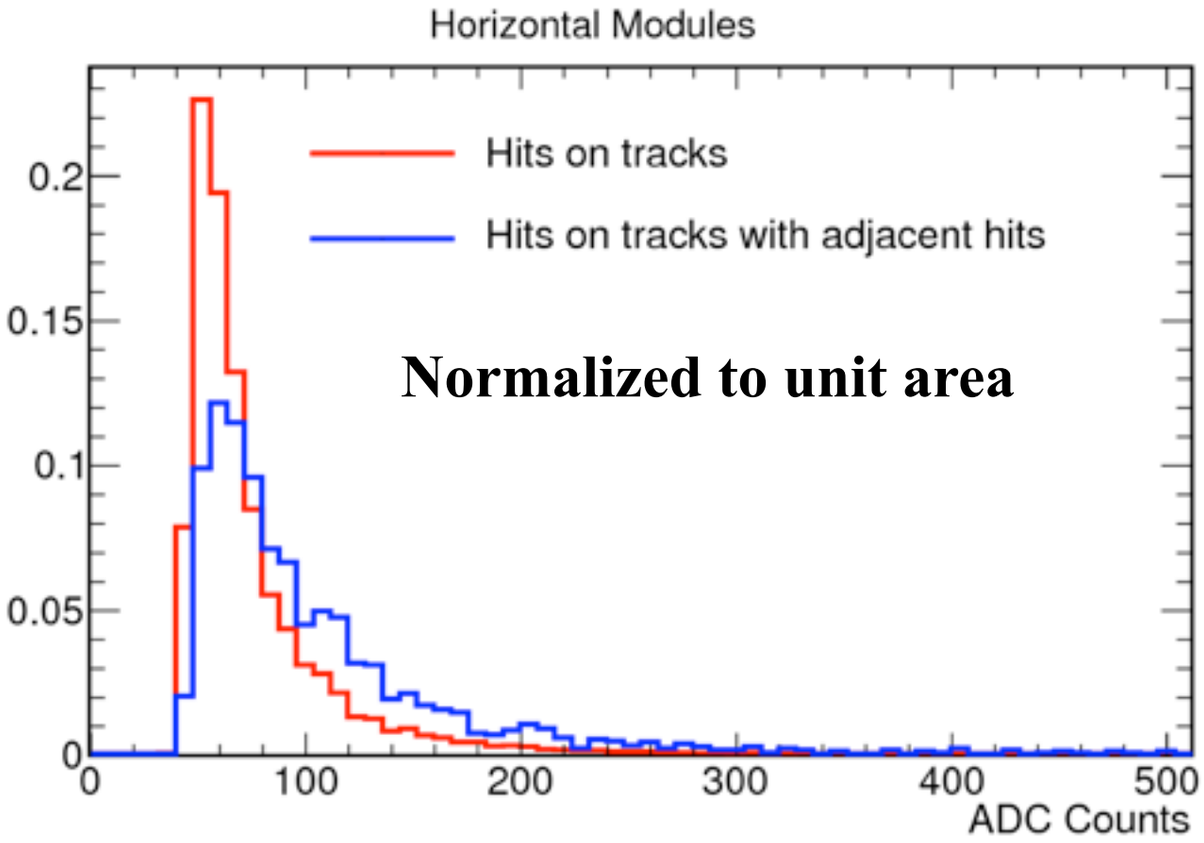


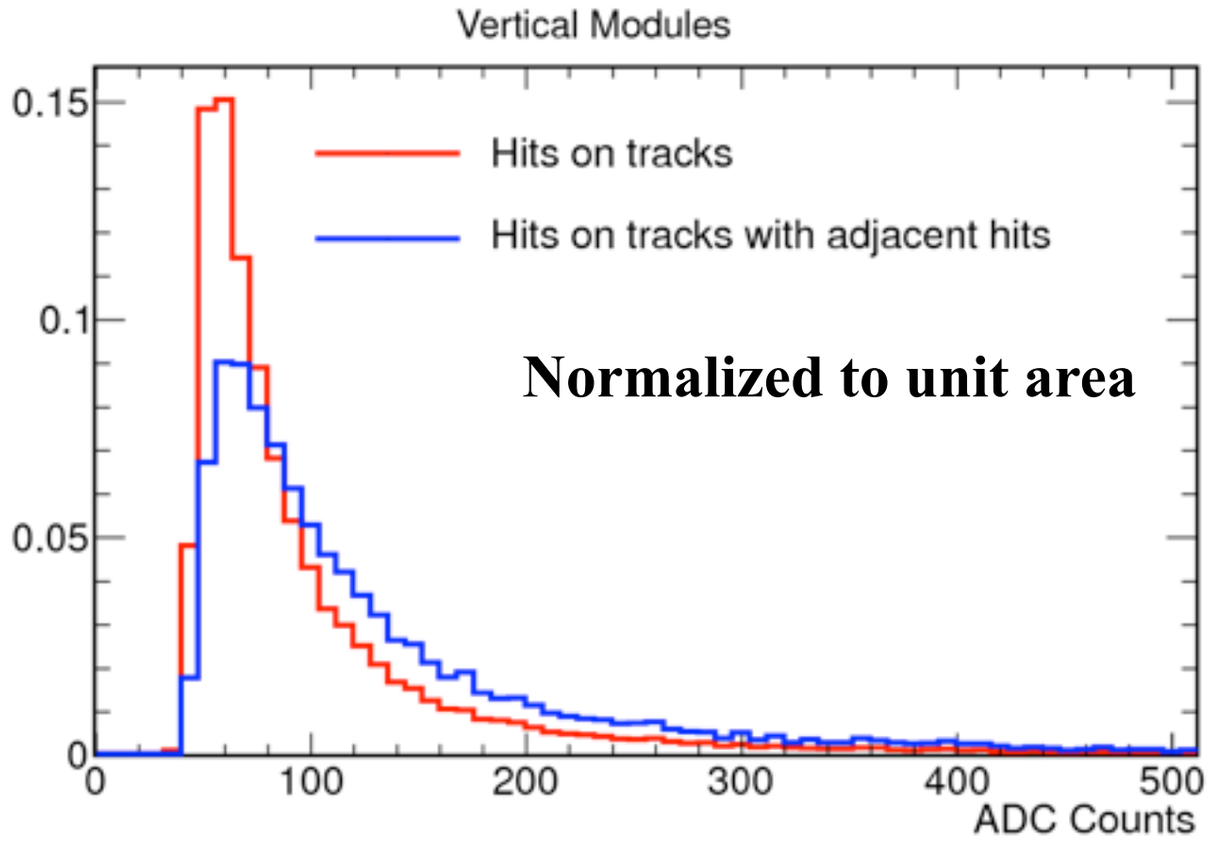
Event Displays

Far Detector Data



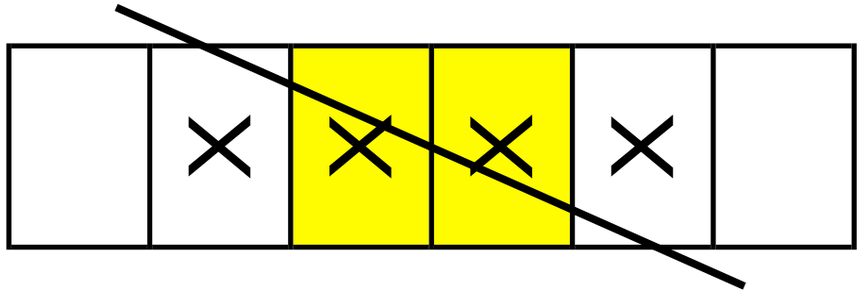
ADC spectra





- Far detector commissioning since March 12
- 224 modules instrumented
- APDs not yet cooled

Cosmic ray tracks from data taken on March 14-15



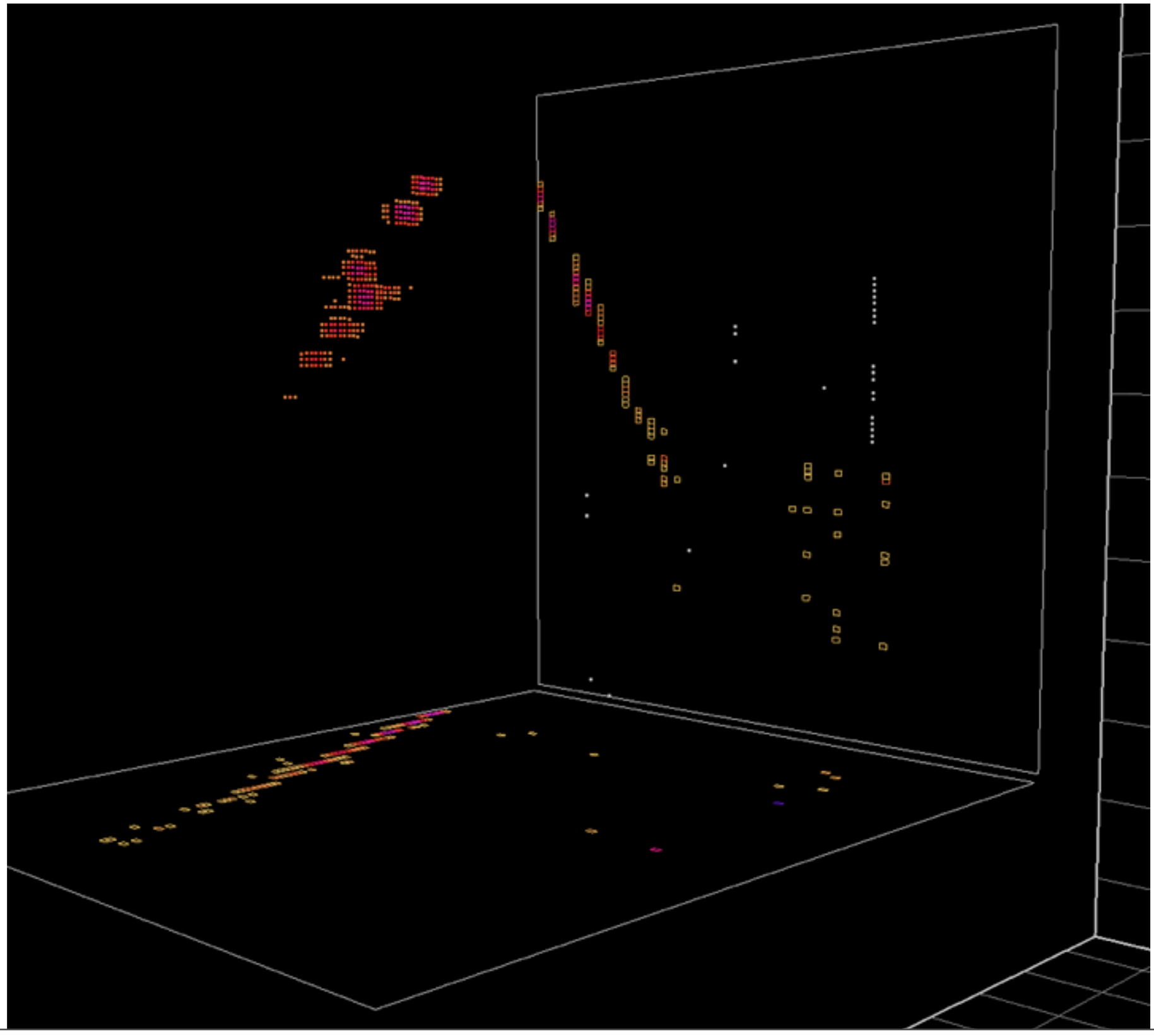
Hits with adjacent hits

Summary

- NOvA construction is well underway
  - More than one third of modules installed
  - On schedule to completion by next summer
- Recorded and analyzing first cosmic rays
- First beam data expected this summer

Thank You

Event Displays



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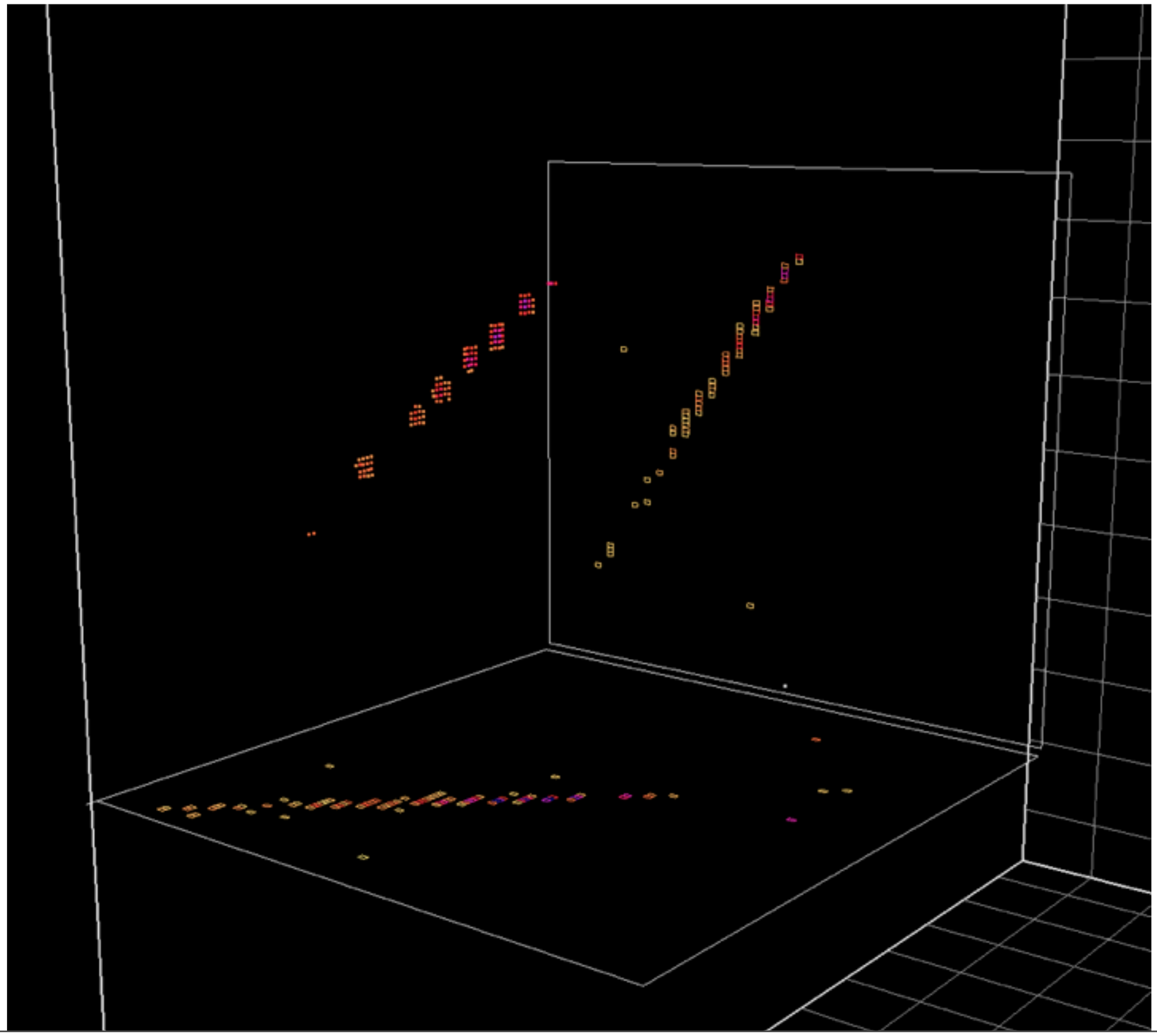

Construction Schedule